



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
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Canada

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D412-664-203TRN
Job Sheet 199403



Part No: D412-664-203TRN

Job Qty: 1 pcs

Part Name: Crosstube Turning Detail



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 8/22/19

Job Tracking No:

Created By: Marie Lajeunesse

Due Date: 9/4/19

Type: Stock

Description:

Note: D412-664-243 REV F IPP Rev:A 08-03-06 new issue DD verified by:eec IPP Rev B 08.04.02 Removed polish
EC verified by: DD

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Lead Time	DAS	Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier				
100	Mori Seiki TL-40 - 1	1 pcs	9/4/19	9/4/19	1.00	1.33	Mori Seiki TL-40 - 1			66	2019/09/25
110	QC 2	1 pcs	9/4/19	9/4/19	0.00	0.00	QC 2 - 1			9-89	
							QC 2 - 12				
							QC 2 - 14				
							QC 2 - 17				
							QC 2 - 19				
							QC 2 - 2				
							QC 2 - 20				
							QC 2 - 22				
							QC 2 - 23				
							QC 2 - 25				
							QC 2 - 32				
							QC 2 - 33				
							QC 2 - 35				
							QC 2 - 39				
							QC 2 - 4				
							QC 2 - 40				
							QC 2 - 44				
							QC 2 - 45				
							QC 2 - 48				
							QC 2 - 49				
							QC 2 - 50				
							QC 2 - 51				
							QC 2 - 52				
							QC 2 - 57				
							QC 2 - 62				
							QC 2 - 63				
							QC 2 - 8				
							QC 2 - 66				
							QC 2 - 64				

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Plex 8/22/19 9:19 AM Dart.lajeunesse.marie

8/22/2019

[Dart Hawkesbury] Job Sheet - Lajeunesse, Marie

					QC 2 - 65	
					QC 2 - 5	
					QC 2 - 71	
					QC 2 - 73	
					QC 2 - 69	DAS
120	Mori Seiki TL-40 - 2 - B4B	1 pcs	9/4/19	1.00 1.67	Mori Seiki TL-40 - 1 - B4B	662019/09/28 9-89
130	QC 2	1 pcs	9/4/19	0.00 0.00	QC 2 - 1	
					QC 2 - 12	
					QC 2 - 14	
					QC 2 - 17	
					QC 2 - 19	
					QC 2 - 2	
					QC 2 - 20	
					QC 2 - 22	
					QC 2 - 23	
					QC 2 - 25	
					QC 2 - 32	
					QC 2 - 33	
					QC 2 - 35	
					QC 2 - 39	
					QC 2 - 4	
					QC 2 - 40	
					QC 2 - 44	
					QC 2 - 45	
					QC 2 - 48	
					QC 2 - 49	
					QC 2 - 50	
					QC 2 - 51	
					QC 2 - 52	
					QC 2 - 57	
					QC 2 - 62	
					QC 2 - 63	
					QC 2 - 8	DAS
					QC 2 - 66	662019/09/28 9-89
					QC 2 - 64	
					QC 2 - 65	
					QC 2 - 5	
					QC 2 - 71	
					QC 2 - 73	
					QC 2 - 69	
140	QC 8	1 pcs	9/4/19	0.00 0.00	QC 8 - 12	
					QC 8 - 14	
					QC 8 - 17	
					QC 8 - 20	
					QC 8 - 25	
					QC 8 - 3	
					QC 8 - 32	
					QC 8 - 33	
					QC 8 - 35	
					QC 8 - 39	
					QC 8 - 4	
					QC 8 - 44	
					QC 8 - 45	
					QC 8 - 49	
					QC 8 - 58	
					QC 8 - 8	
					QC 8 - 9	
					QC 8 - 68	DAS
					QC 8 - 67	76 9-89

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8/22/2019

[Dart Hawkesbury] Job Sheet - Lajeunesse, Marie

					QC 8 - 1 (A)	
					QC 8 - 47	
					QC 8 - 40	
					QC 8 - 52	
					QC 8 - 23	
					QC 8 - 57	
145 Crosstubes - 2 - B4B	1 pcs	9/4/19	0.00 0.25		Crosstubes - 1 - B4B	
					Crosstubes - 2 - B4B	BB 09/30/19
					Crosstubes - 3 - B4B	
					Crosstubes - 4 - B4B	
150 Crosstubes - 3 - B4B HANE FINISH	1 pcs	9/4/19	0.00 0.92	HANE FINISH	Crosstubes - 1 - B4B	
					Crosstubes - 2 - B4B	
					Crosstubes - 3 - B4B	✓ OCT 15 2019
					Crosstubes - 4 - B4B	
160 QC 7	1 pcs	9/4/19	0.00 0.00		QC 7 - 10	
					QC 7 - 13	
					QC 7 - 14	
					QC 7 - 15	
					QC 7 - 17	
					QC 7 - 18	
					QC 7 - 19	
					QC 7 - 2	
					QC 7 - 28	
					QC 7 - 3	
					QC 7 - 30	
					QC 7 - 34	
					QC 7 - 36	
					QC 7 - 37	
					QC 7 - 41	
					QC 7 - 47	
					QC 7 - 48	
					QC 7 - 51	
					QC 7 - 58	
					QC 7 - 59	
					QC 7 - 60	
					QC 7 - 9	
					QC 7 - 68	
					QC 7 - 50	DAS
					QC 7 - 67	76
					QC 7 - 40	9-89
					QC 7 - 24	2019-11-1
					QC 7 - 43	
					QC 7 - 61	
					QC 7 - 81	
170 Packaging 3-1 - Stock - B4B	1 pcs	9/4/19	0.00 0.00		Packaging 3 - 1 - B4B	
					Packaging 3 - 2 - B4B	
					Packaging 3 - 3 - B4B	
					Packaging 3 - 4 - B4B	
					Packaging 3 - 5 - B4B	
					Packaging 3 - 6 - B4B	
					Packaging 3 - 7 - B4B	
					Packaging 3 - 8 - B4B	
					Packaging 3 - 9 - B4B	
					Packaging 3 - 10 - B4B	
					Packaging 3 - 11 - B4B	
					Packaging 3 - 12 - B4B	
					Packaging 3 - 13 - B4B	
					Packaging 3 - 14 - B4B	
					Packaging 3 - 15 - B4B	

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				Packaging 3 - 16 - B4B		
				Packaging 3 - 17 - B4B		
				Packaging 3 - 18 - B4B		
				Packaging 3 - 19 - B4B		
				Packaging 3 - 20 - B4B		
				Packaging 3 - 21 - B4B		
				Packaging 3 - 22 - B4B		
				Packaging 3 - 23 - B4B		
				Packaging 3 - 24 - B4B	EB 2019-11-1	
				Packaging 3 - 25 - B4B		
				Packaging 3 - 26 - B4B		
				Packaging 3 - 27 - B4B		
				Packaging 3 - 28 - B4B		
				Packaging 3 - 29 - B4B		
				Packaging 3 - 30 - B4B		
				Packaging 3 - 31 - B4B		
				Packaging 3 - 32 - B4B		
				Packaging 3 - 33 - B4B		
				Packaging 3 - 34 - B4B		
				Packaging 3 - 35 - B4B		
				Packaging 3 - 36 - B4B		
180	QC 21 - SA	1 pcs	9/4/19	0.00 0.00	QC 21 - SA - 21	DAS
					QC 21 - SA - 70	21 NOV 0 1 2019
					QC 21 - SA - 53	9-55

Part Op 100 - 1-Fill tube with sand & install plugs 412-203 on both ends as per Folio FA166 2-Face both sides of tube 3-Turn first
 Descriptions: taper section on both side as per Folio FA166 4- blend transition lines using belt sander with 60 grit sandpaper

110 - (QC2- Inspect parts off machine FAI/FAIB)

120 - Mori Seiki TL-40 (Mori Seiki CNC Lathe Large) 1-Turn second taper on both sides as per Folio FA166 2- Blend transition lines using belt sander with 60 grit sandpaper, 3- Remove sand and plugs 4-Scribe part # and batch # using vibrating stylus

130 - (QC2- Inspect parts off machine FAI/FAIB)

140 - (QC8- Inspect parts - second check)

145 - GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.

150 - 1- handfinish X-TUBE INSIDE AND OUT

160 - (QC7-Inspect Chemical Conversion Coat)

170 - (Identify as per dwg & Stock Location: _____) LOCATION : LG014

180 - (QC21- Final Inspection - Work Order Release)

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D6009-129	Crosstube Material	1 pcs (1 ea)	100-Mori Seiki TL-40 - 1	F123972

Job Allocations

Operation	Component Part	Required	Inventory	Allocated
100-Mori Seiki TL-40 - 1	D6009-129	1	80	0

Part Specifications

Specifications could not be found.



Container No: S217007



Part: D412-664-203TRN

Job No: 199403

Serial No/Batch: S217007

Revision: F

Inspector:

Exp Date:

Instructions:

Dart Aerospace Ltd.
 1270 Aberdeen Street
 Hawkesbury, ON K6A 1K7
 CANADA
 TEL.: 1 813 832-5200
 Email: sales@dartaero.com
 www.dartaerospace.com

Date: 09/25/19

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DART AEROSPACE LTD	Work Order:	199403
Description: Crosstube Assembly (412 High Aft)	Part Number:	D412-664-243
Inspection Dwg: D412-664-243 Rev: F		Page 1 of 2

FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.684	+0.005/-0.000	2.689	✓	CNC-04	
	2.748	+0.005/-0.000	2.753	✓	↓	
	2.884	+0.005/-0.000	2.889	✓	↓	
	3.019	+0.005/-0.000	3.024	✓	CNC-05	
	3.163	+0.005/-0.000	3.168	✓	↓	
	3.308	+0.005/-0.000	3.313	✓	↓	
	3.429	+0.005/-0.000	3.434	✓	↓	
	2.990	+0.005/-0.000	2.994	✓	CNC-04	
	2.618	+0.005/-0.000	2.623	✓	"	
	0.200	+/-0.010	.200	✓	CNC-08	
	R0.063	+/-0.010	.063	✓	RG	
	R0.500	+/-0.010	.500	✓	"	
	4.971	+/-0.030	4.970	✓	CNC-08	
SIDE B	2.684	+0.005/-0.000	2.689	✓	CNC-04	
	2.748	+0.005/-0.000	2.753	✓	↓	
	2.884	+0.005/-0.000	2.889	✓	↓	
	3.019	+0.005/-0.000	3.024	✓	CNC-05	
	3.163	+0.005/-0.000	3.167	✓	↓	
	3.308	+0.005/-0.000	3.313	✓	↓	
	3.429	+0.005/-0.000	3.434	✓	↓	
	2.990	+0.005/-0.000	2.995	✓	CNC-04	
	2.618	+0.005/-0.000	2.623	✓	"	
	0.200	+/-0.010	.207	✓	CNC-08	
	R0.063	+/-0.010	.063	✓	RG	
	R0.500	+/-0.010	.500	✓	"	
	4.971	+/-0.030	4.986	✓	CNC-08	
	124.100	+/-0.020	124.100	✓	Tape	

1 2 3 4 5 6 7 8

Item	Qty	Part Number	Description
1	X	D412-684-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D8009-128	CROSSTUBE
3	2	D3696-063-670	RUBBER CUSHION
4	1	D2898-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	AR	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
10	AR	PROSEAL 880 B-2	SEALANT

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D8009-128
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C8-2, HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, REMOVE MASKING AND APPLY MATTE CLEAR COAT
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PIN "D412-684-243" AND BIN ON INSIDE OF CUFF PER QSI 044 8.4 (VIBRATING STYLUS)
- 7) WEIGHT: 47.0 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY.
- 10) WHEN TRANSITIONING TO STOCK MAT'L, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- TURNING
- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R30 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 12) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPI INSPECTION.
- ASSEMBLY
- 13) INSTALL D2898-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 018.
- 14) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3696-063-670 RUBBER CUSHIONS TO SECURE THE D2898-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- 15) APPLY A THIN COAT OF PROSEAL 880 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEAL D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 880 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 16) TORQUE CLAMPS ON D2898-1 SUPPORT 60 TO 100 IN-LB. TORQUE CLAMPS ON D3189-1 CHAFING SHIELD 40 TO 60 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

1 2 3 4 5 6 7 8

RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 199403 M 15
19-0822

RELEASED
2016-05-26

F	NOTES RE-CHECKED, SCOTCH-WELD WAS MAGNORON (C8-1) ADD CLAMP RETORQUE (AS-1) REMOVE ABRASION STRIP, ADD INSPECTION WINDOW (C8-1), CHAFING SHIELD NOW 4.38 WIDE (C8-3), ADD 7% CURLING (B8-1) CHG BEND HEIGHT TOL. TO 0.024 (C1-3), CHG CLIFF TOL. (D2-4), CLAMPS FLIPPED TO PREVENT CHAFING (B7-4, B7-5), INCORP. DEO E-2-4	CP	14.04.01
E	REFORMATRIVISE GENERAL NOTES: REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS: RELOCATED FLAG #8 PER C44 (B8-4) (Z1 A8-5); ADD TOLERANCE (Z1 B8-3, C4-3, C4-4) C8-3 TO UNFINISHED DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	06.08.30
D	REMOVE D2732-068, CHANGE TO D3696-063-670	PH	07.03.06
C	REMOVE D2698-000-1087, ADD D2732-068 & MAGNORON (B8-1), MS21920-32 WAS MS21920-30	MB	06.10.27
B	ADD HOLES FOR COMPATIBILITY WITH BRITAA	PH	06.02.04
A	NEW ISSUE	PH	01.10.17
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	14.04.01		
DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA			
REV. F			
DRAWING NO. D412-684-243			
SHEET 1 OF 4			
TITLE			
CROSSTUBE ASSEMBLY (412 HI AFT)			
SCALE			
NTS			
COMPONENT 0301 BY DART AEROSPACE LTD			
THIS DRAWING IS A PROPERTY OF DART AEROSPACE LTD. IT IS TO BE USED ONLY FOR THE PURPOSES AND IN THE MANNER SPECIFIED HEREIN.			



Entered: _____ Date: _____

WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

Route update only ☐

NCR No. _____

Job: _____

Part No. _____

DISPOSITION

Rework ☐ ☐ ☐
Scrap ☐ ☐ ☐
Use-as-is ☐ ☐ ☐

DEPARTMENT/PROCESS

Skid-tube ☐ ☐ ☐
Machining ☐ ☐ ☐
Large Fab ☐ ☐ ☐

Cross tube ☐ ☐ ☐
Small Fab ☐ ☐ ☐
Finishing ☐ ☐ ☐

Eng. (Non-AW) ☐ ☐ ☐
Prod. Eng. Coord. ☐ ☐ ☐
Rec/Store/Packaging ☐ ☐ ☐
Engineering ☐ ☐ ☐
Water Jet ☐ ☐ ☐
Supplier ☐ ☐ ☐
Quality ☐ ☐ ☐

Date: _____

Sequence #: _____

QTY Affected: _____

MRB (QSI042)

Description Work Order Deviation

Disposition

Completed By _____

Lead hand / Supervisor _____

QC / QA Coordinator _____

Root Cause

Operator ☐ ☐ ☐
Manufacturing Process ☐ ☐ ☐
Equip/Tooling ☐ ☐ ☐
Handling/Preservation ☐ ☐ ☐
Material ☐ ☐ ☐
Product Improvement ☐ ☐ ☐
Process Improvement ☐ ☐ ☐
Human Factors ☐ ☐ ☐

FAULT CATEGORY

Pressure/Forced	Contamination	Power Loss/Surge	Positioned Wrong
☐	☐	☐	☐
Bending	Misaligned/off center	Folio/Program	Outside Tolerance
☐	☐	☐	☐
Crushing	BOM/Route	Grain Direction	Drawing
☐	☐	☐	☐
Cracks	Broken/Damage/Defect	Weld	Finish
☐	☐	☐	☐
Crimp/Kink/Ripple/Wave/Twist	Incomplete/Unclear Instructions	Wrong Stock Pulled	Part Lost/Missing
☐	☐	☐	☐
Marks/Chatter	Drill Holes	Out of Sequence	Misread
☐	☐	☐	☐
Mislabeled	Fit/Function	Off-set/Set-up	
☐	☐	☐	

Other/Details: _____